LEGEND

(1) TERRAIN UNIT SYMBOLS

Simple Terrain Units:

e.g. Ft (SURFICIAL MATERIAL)(surface expression)

Note: Two letters (in order of decreasing importance based on their areal extent) may be used to describe surface expression, or letters may be omitted if information is lacking.

Composite Units: Two or three groups of letters are used to indicate that two or three kinds of terrain are present within a map unit.

e.g. Mv=R indicates that both components are approximately equal in proportion.
e.g. Mv/R indicates that "Mv" is more extensive than "R"
e.g. Mv//R indicates that "Mv" is considerably more extensive than "R"

Stratigraphic Units: Groups of letters are arranged one above the other where one or more kinds of surficial material overlie a different material. Veneers are assumed to overlie bedrock, unless otherwise noted in the stratigraphic unit label.

e.g. $\frac{Cv}{FG}$ indicates that "Cv" overlies "FG"

(2) MATERIALS

A	Anthropogenic	Culturally-made or culturally-modified geological materials such that their initial physical properties (e.g. structure, cohesion, compaction) have been drastically altered. Includes excavations and tailings from mining operations.
C	Colluvial	Materials that have reached their present positions as a result of direct, gravity-induced movement involving no agent of transportation such as water or ice, although the moving material may have contained water and/or ice. Includes talus and debris flow deposits, as well as reworked till on steep slopes.
F	Fluvial	Materials transported and deposited by streams and rivers; synonymous with alluvial. Includes well-sorted sand, gravel, and overbank silt in post-Fraser glaciation floodplains, terraces, and fans.
FG	Glaciofluvial	Materials that exhibit clear evidence of having been deposited by glacial meltwater streams either directly in front of, or in contact with, glacier ice. Includes sand and gravel, often stratified, which may show evidence of ice melting (slumped structures). Features include deltas, kame terraces, river terraces, and meltwater channels.
LG	Glaciolacustrine	Lacustrine materials deposited in or along the margins of glacial (ice-dammed) lakes, including sediments that were released by the melting of floating ice. Includes laminated or bedded to massive fine sand, silt and clay, and may contain ice-rafted stones.
M	(Moraine) till	Material deposited directly by glacier ice without modification by any other agent of transportation. Includes three subclasses:
	M^1	Light to dark olive grey, moderately to highly consolidated lodgement till derived from phyllite, chlorite schist and greenstone, limestone and dolostone, quartzite and slate (Eagle Bay Assemblage) and cherty felsic to mafic metavolcanics and metasediments (Fennell Formation). Texture of matrix is generally a mix of clay and silt. Average clast size is 1-2 cm; largest clasts are large boulders (over 2 m).
	M^2	Light to medium grey, loose, sandy, clast-supported ablation till derived from granite and granodiorite of the Baldy Mountain and Thule River Batholiths. Generally found in boulder fields at moderate to high elevations. West of the Thompson River, M^2 is derived from the Thule River Batholith. M^2 occurring in the eastern map area, is derived from Eagle Bay Assemblage rocks (described for M^1). Average clast size is 2-5 cm; largest clasts are very large boulders (up to 4 m).
	M^3	Light to medium grey, very highly consolidated lodgement and ablation till derived from granite and granodiorite of the Baldy Mountain Batholith. Texture of matrix is generally a mix of coarse sand and clay. Clast content usually contains > than 75% granodiorite clasts. Average clast size is 0.25 cm, approximately the size of mineral grains within the granite. Maximum clast size is over 3 m..
O	Organic	Sediments composed largely of organic materials resulting from the accumulation of vegetative matter. They contain at least 30% organic matter by weight (17% or more organic carbon). Includes swampy areas on high plateaus and on floodplains.
R	Bedrock	Bedrock outcrops and rock covered by a thin mantle (up to 10 cm thick) of unconsolidated or organic materials. Includes granite and granodiorite of the Baldy Mountain and Thule River Batholiths, metasedimentary and metavolcanic rocks of the Fennel Formation and Eagle Bay Assemblage.

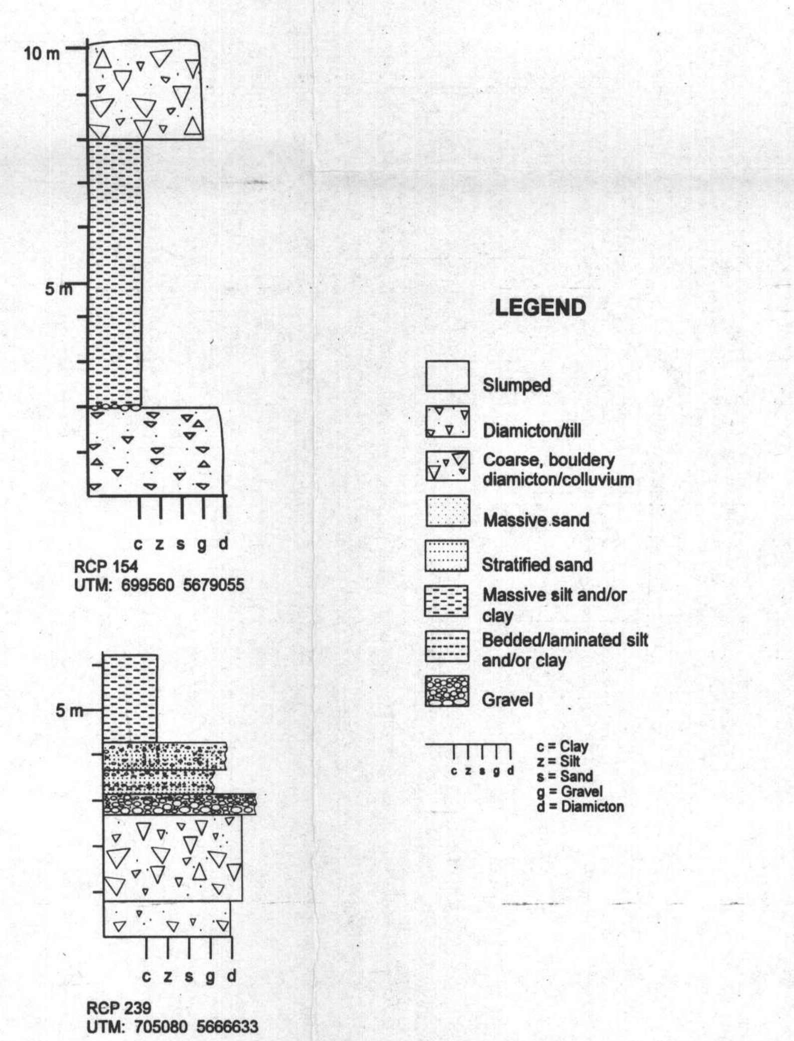
(3) SURFACE EXPRESSION

a	Moderate slope	A planar surface sloping at 16°, to 26°.
b	Blanket	A mantle of unconsolidated materials thick enough to mask minor irregularities of the surface of the underlying unit, but still conforms to the general underlying topography. Greater than 1 metre thick, and possesses no construction forms typical of the materials genesis; outcrops of the underlying unit are rare
c	Cone	A cone or segment of a cone with a relatively smooth slope gradient from apex to toe greater than 15°, and a longitudinal profile that is either straight, concave or convex.
d	Depression	Circular or irregular area of lower elevation (hollow) than the surrounding terrain and marked by an abrupt break in slope; side slopes within the depression are steeper than the surrounding terrain; depressions are two or more metres in depth.
f	Fan	A relatively smooth segment of a cone with a slope gradient from apex to toe, up to, and including 15°, and a longitudinal profile that is either straight, concave, or convex.
h	Hummock	Steep sided hillocks and hollows of unconsolidated material with multidirectional slopes dominantly between 15 and 35°. Local relief is greater than 1 metre. In plan, an assemblage of non-linear, generally chaotic forms that are rounded or irregular in cross-profile.
j	Gentle slope	A planar surface sloping at 3 to 15°.
p	Plain	A level or very gently sloping, unidirectional surface with gradients up to and including 3°; local surface irregularities generally have a relief of less than 1 metre.
r	Ridge	Elongate hillock with slopes dominantly between 15 and 35° (26-70%) if composed of unconsolidated materials; bedrock slopes may be steeper. Local relief is greater than 1 metre. In plan, an assemblage of parallel or sub-parallel linear forms.
s	Steep slope	A planar surface steeper than about 35°.
t	Terrace	A single or assemblage of step-like forms where each step consists of a scarp face and a horizontal or gently inclined surface above it.
v	Veneer	A mantle of unconsolidated materials too thin to mask the minor irregularities of the surface of the underlying material. It ranges in thickness from 10 cm to 1 metre, and possesses no form typical of the material genesis.

(4) TEXTURE

Map Symbol	Clastic Term	Definition
s	sand	0.062 - 2 mm
p	pebbles	2 - 64 mm
k	cobbles	64 - 256 mm
b	boulders	> 256 mm
d	mixed fragments	2 - > 256 mm
r	rubble	2 - 256 mm

STRATIGRAPHIC SECTIONS



(5) GEOLOGICAL PROCESSES

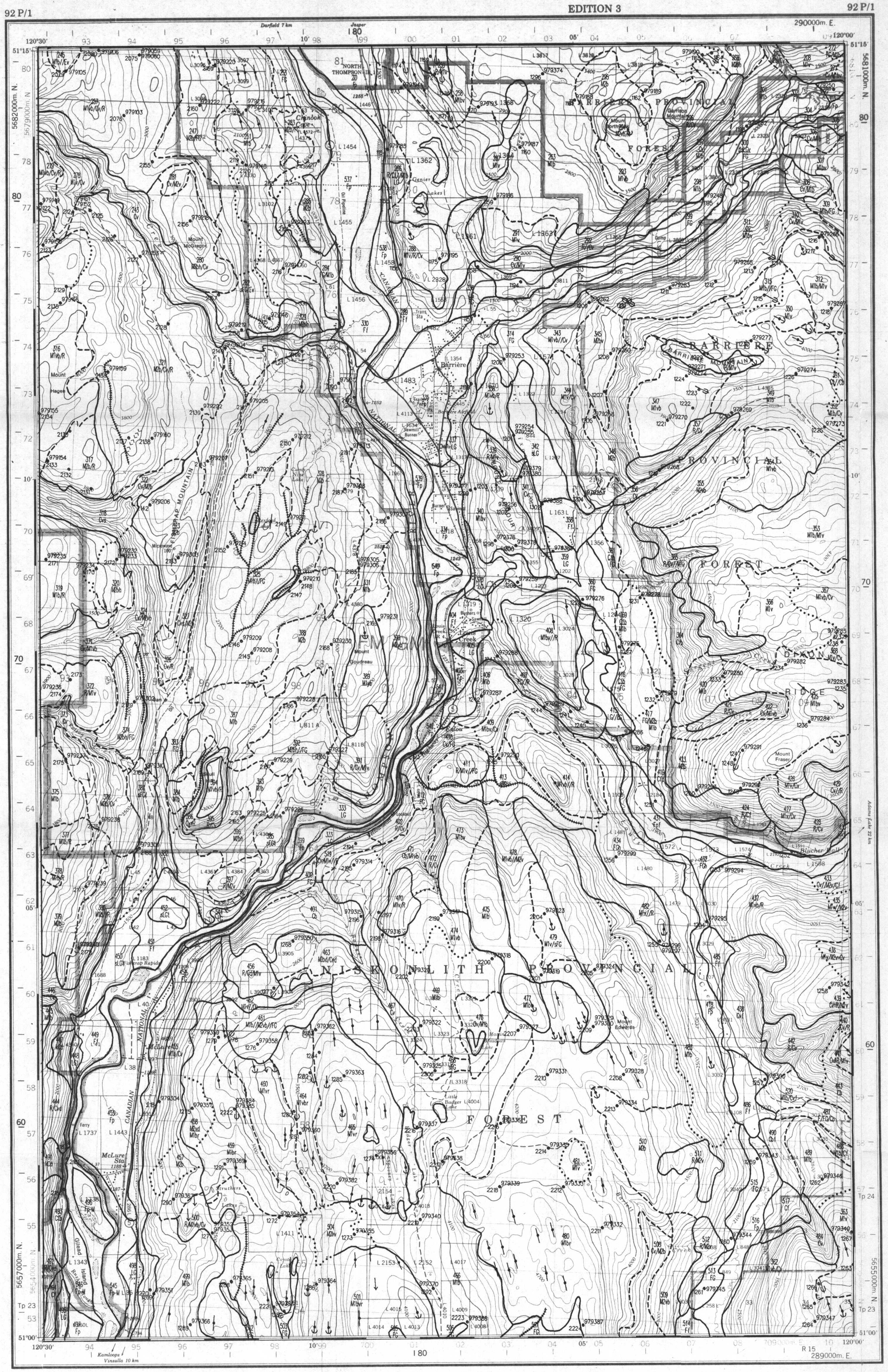
M	Meandering channel; refers to stream channel characterized by regular and repeated of bends of similar amplitude and wave length.
Rb	Rock fall; the relatively free falling or precipitous movement of a newly detached fragment of bedrock of any size from a cliff or other very steep slope.
V	Gully erosion; formation of gullies in surficial materials and/or bedrock by a variety of processes including erosion by running water; erosion as a result of weathering and the impact of falling rocks, debris slides, debris flows and other means of mass movement.

CRITERIA FOR DETERMINING LINES/BOUNDARIES:

———	(Solid). Well-defined, sharp boundaries that can be precisely delimited at the scale of mapping.
------	(Dashed). Boundaries that are gradational over a short distance or that can be only approximately located, or where precise boundary locations are masked by forest.
....	(Dotted). Assumed boundaries, and boundaries that are gradational over considerable distances.

SYMBOLS

	Drumlin, drumlinoid ridge		Esker (flow direction known; unknown)
	Lineations, flutings		Meltwater channel (flow direction known; unknown)
	Craig and tail		Limit of Submergence
	Roche Moutonnee		Small Landslide (headwall scar, headwall scar and track)
	Striae (known, unknown sense)		Gravel pit (inactive)
1 2	Striae (numbers indicate relative ages)	979188	Till sample site
	Cirque	1018	Fieldcheck site
	Moraine ridge	RCP 001	Stratigraphic section



BRITISH COLUMBIA
Ministry of Employment and Investment
Energy and Minerals Division
Geological Survey Branch

Geological Survey Branch

OPEN FILE 1998-2

TERRAIN GEOLOGY OF THE LOUIS CREEK AREA

NTS 92 P/1E

By R.C. Paulen, P.T. Bobrowsky (P.Geo.), E.C. Little, A.C. Prebble and A. Ledwon

Scale 1:50 000

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres

Field survey carried out June to August, 1997

For an overview of the Quaternary geology of the Louis Creek area, please refer to the reports: "Till Geochemistry of the Adams Plateau - North Barriere Lake Area (82M/4 and 5)" by P.T. Bobrowsky *et al*. (1997), Open File 1997-9 and "Till Geochemistry of the Louis Creek - Chua Chua Creek Area (92P/1E and 8E)" by P.T. Bobrowsky *et al*. (1998), Open File 1998-6. Geology based on air photo interpretation by R.C. Paulen and E.C. Little, followed by ground truthing in areas indicated on map during 1997 by map authors.

QUATERNARY GEOLOGY NOTES

QUATERNARY STRATIGRAPHY OF SOUTH-CENTRAL BC

The present-day landscape of the Louis Creek map area is the result of two cycles of glaciation, one interglacial, and vigorous early-Holocene erosion and sedimentation (Fulton and Smith, 1978; Ryder *et al*., 1991). Although not necessarily present in this map area, the following lithologic units and their correlative geologic climate units have been identified in south-central B.C.

Stratigraphically oldest and identified only at two locations some 60 and 100 km to the south, are the interglacial Westwold Sediments. The deposits consist of cross-stratified gravelly sand capped by marl, sand, silt, and clay, all of which are equivalent to the Highbury non-glacial interval in the Fraser Lowland (Sangamonian). Next in age are Okanagan Centre Drift deposits, consisting of coarse, poorly stratified gravel, till and laminated silt, identified at Heffley Creek (20 km south of the map area), and elsewhere farther south. The sediments were deposited during the Okanagan Centre Glaciation, equivalent to the Semiahmoo Glaciation in the Fraser Lowland (early Wisconsinan). Middle Wisconsinan, Olympic Non-Glacial Bessette Sediments overlie the Okanagan Centre Drift. They consist of nonglacial silt, sand and gravel with some organic material and up to two tephras. The Kamloops Lake Drift (25.2 ka; Dyck and Fyles, 1963) overlies the Bessette sediments, and underlies the present-day surface cover of postglacial deposits. This unit consists of silt, sand, gravel and till deposited during the Fraser Glaciation (Late Wisconsinan).

The surface and near-surface sediments mapped in the Louis Creek area directly result from the last cycle of glaciation and deglaciation (Fraser Glaciation) as well as ensuing post-glacial activity.

FRASER GLACIATION

The onset of Fraser glaciation in the map areas began in the Coast, Cariboo and Monashee Mountains. Valley glaciers descended to lower elevations to form piedmont lobes in the Interior Plateau and eventually coalesced to form a mountain ice sheet (Ryder *et al*., 1991). Ice sheet margins reached a maximum elevation between 2200 and 2400 m along rimming mountains; the entire Shuswap Highland, except perhaps Dunn Peak (2630 m) and higher peaks to the north, was completely buried beneath an ice cap by approximately 19 ka. At Fraser Glaciation maximum, regional ice flow was to the south-southeast, with deviations up to 45° (Fulton *et al*., 1986). Ice flow was initially diverted down the North Thompson River valley and also during deglaciation. Basal till deposits, which range widely in texture with the underlying bedrock, blanketed the land surface.

Deglaciation of the Interior Plateau was rapid; the equilibrium line rose considerably, reducing the area of accumulation for the Cordilleran ice sheet, and the ice mass decayed by downwasting. Ablation till was deposited by stagnating ice in several high-elevation portions of the region. As uplands were deglaciated prior to low benches and valleys, meltwater was channeled to valley sides, resulting in kame terraces and ice-contact sediments that predominately occur below 540 m. Valleys clear of ice above the stagnating glaciers in their lower reaches became the confinement for meltwater blocked from drainage, resulting in local mantles of glaciolacustrine sediments. Observations show that these ice-dammed lakes attained a minimum elevation of 425 m (above present day sea level). Radiocarbon dates of 11.3 ka to the north at McGillivary Creek (Clague, 1980), and 10.1 and 9.84 ka on Mount Fadear Plateau (Blake, 1986) to the east indicates that deglaciation began about 12 ka and the modern drainage pattern was established by 9 ka. A minor readvance of ice from local peaks and summits to the north occurred between 11 and 6.6 ka (Duford and Osborn, 1978).

HOLOCENE POST-GLACIAL

Once ice-dammed lakes were released, meltwaters carrying heavy sediment loads deposited thick units of stratified sand and gravel in valleys. As sediment loads decreased, deposition was replaced by erosion, and water courses cut down through valley fills, leaving glaciofluvial terraces abandoned on valley sides. Following the complete deglaciation of the region, unstable and unvegetated slopes were highly susceptible to erosion and sedimentation. Intense mass wasting of surface deposits on oversteepened valley slopes resulted in the deposition of colluvial fans and aprons along valley bottoms. Most post-glacial deposition occurred within the first few hundred years of deglaciation, and certainly before the eruption of Mt. Mazama, 6.6 ka, which deposited tephra near the present-day ground surface. Fluvial plain deposits and active talus slopes typify the modern sedimentation in the area.

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